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(54) **Liquid containers**

(57) A filled liquid container 10 of thermoplastics material comprises a filled hollow vessel 11 with a tube 12 which extends from the vessel, has a rupturable ring section 13 spaced from the vessel and is sealed beyond the rupturable ring section to form a grippable tab. Such a filled liquid container can be made by blow moulding thermoplastics material to give a hollow vessel with a tube which extends from the vessel and has a rupturable ring section spaced from the vessel, filling the vessel with liquid through the tube, and sealing the tube beyond the rupturable ring section.

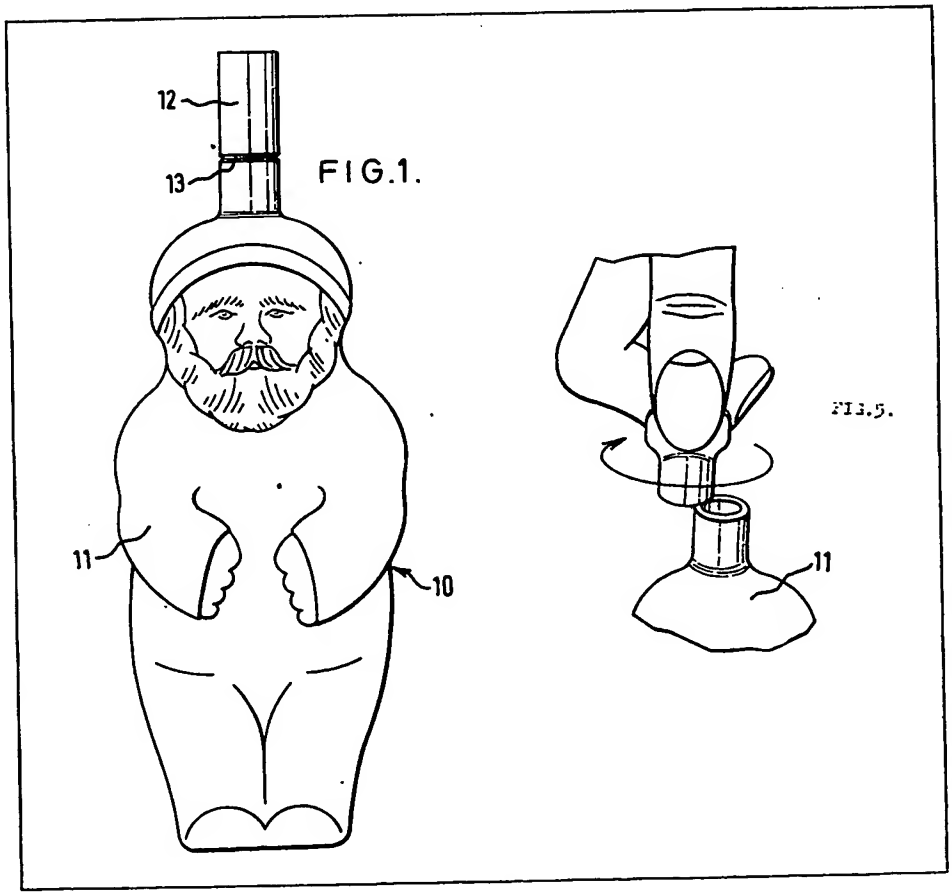

FIG.1.

FIG.5.

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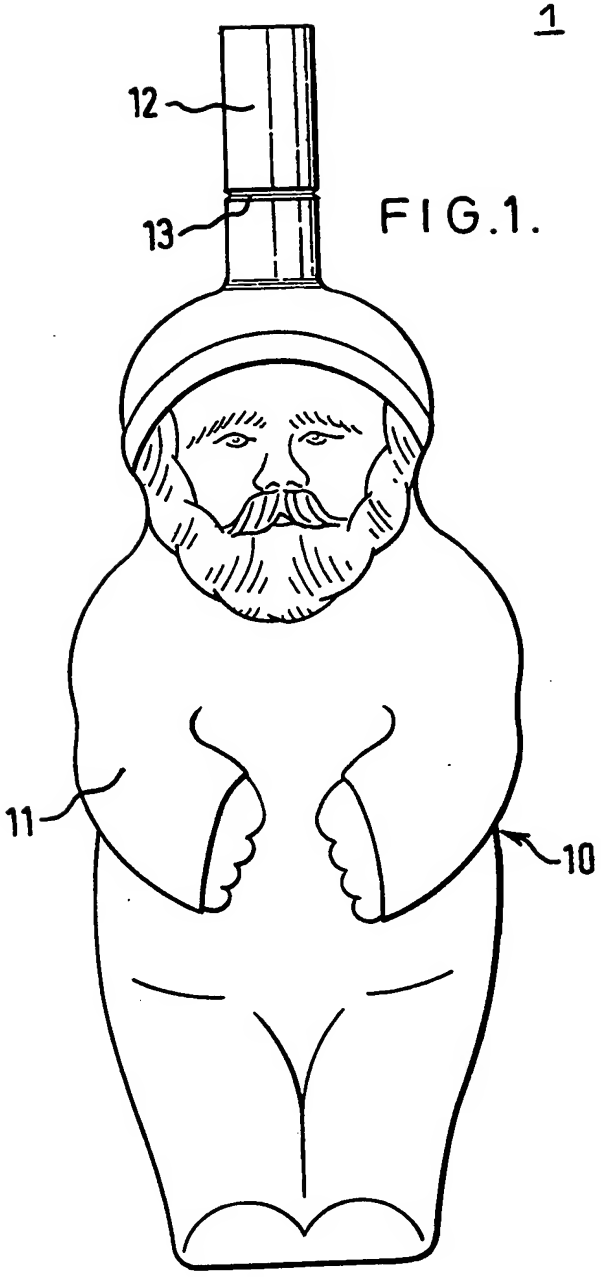


FIG.1.

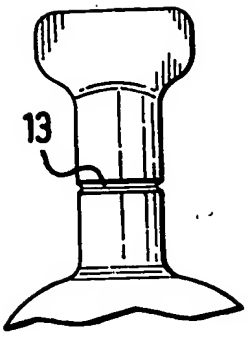


FIG.3A.

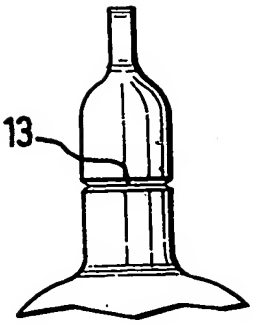


FIG.3B.

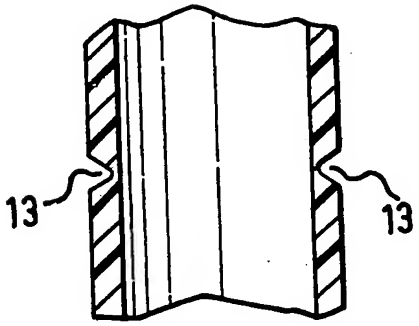


FIG.4.

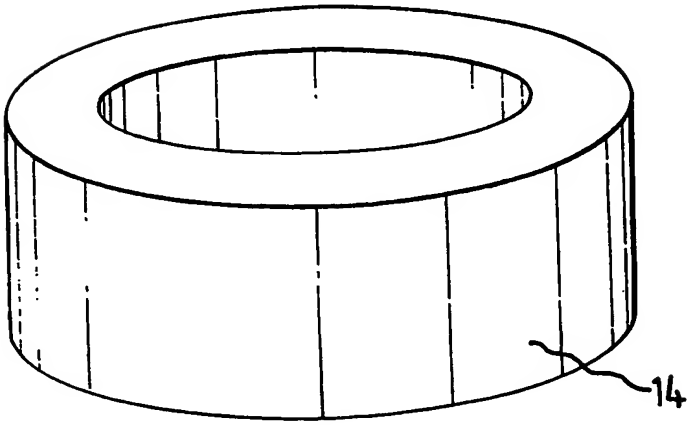
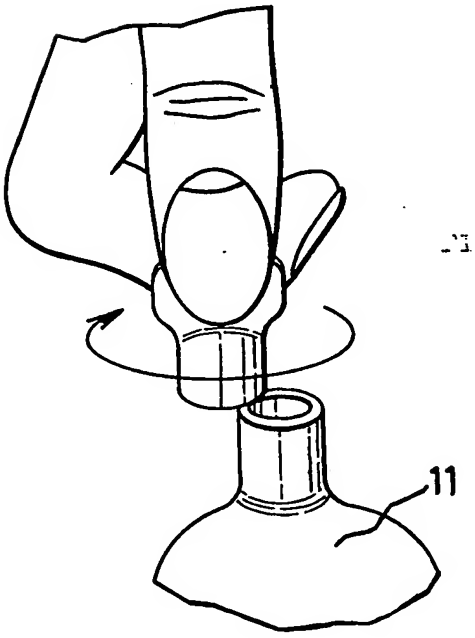


FIG.2.



SPECIFICATION

Liquid containers

The present invention relates to liquid containers. In particular but not exclusively, the invention relates to the manufacture of filled drink containers.

According to the present invention there is provided a filled liquid container of thermoplastics material which comprises a filled hollow vessel with a tube which extends from the vessel, has a rupturable ring section spaced from the vessel and is sealed so that the seal forms a grip portion, beyond the rupturable ring section, which can be gripped so that a force can be exerted to rupture said section.

The invention also provides a method of manufacturing a filled liquid container which comprises blow moulding thermoplastics material to give a hollow vessel with a tube which extends from the vessel and has a rupturable ring section spaced from the vessel, filling the vessel with liquid through the tube, and sealing the tube beyond the rupturable ring section so that the seal forms a grip portion which can be gripped so that a force can be exerted to rupture said section.

To obtain liquid from a filled liquid container of the invention, the tube is grasped beyond the rupturable ring section and a twisting or other rupturing action is applied to break the tube at the rupturable section. As such, the free end of the tube and thus the seal can be removed from the container. Thereafter the remainder of the tube can be used as a spout to dispense the liquid, or, if desired it can be used as a straw.

The container is preferably made of a transparent or translucent coloured or uncoloured, thermoplastics material. The material could also be opaque. Translucent polyethylene gives good results and is economic to use.

The vessel can take various forms; where the liquid is a soft drink intended for sale to children the container can be given "novelty" appeal by forming the vessel as a figure. The figure can be comic or have some other expression or for example it can be a representation of a cartoon character or other figure familiar to children. If the vessel is in the form of a figure it is convenient for the tube to extend from the figure's head.

In arriving at a design for the vessel it is usually necessary to consider the method of manufacture which will in practice be used. High-speed continuous production is desirable and this will usually require the transfer by conveyor of the unfilled, unsealed containers to a filling station and subsequent transfer to a sealing station. Moreover for even flow it will be necessary to make the unfilled, unsealed containers at the same rate as that at which they can be filled at the filling station.

While it may be possible to design a suitable unfilled, unsealed container which is free-standing (e.g. by having a squat vessel with a large base), we prefer to employ a vessel which has a bottom that can be received in the recess of a container mount. Such a mount can take the form of an annulus and effectively lower the centre of gravity of the container. Each container is held in its mount as it passes to the filling and sealing stations and can thereafter be removed.

In the method of the present invention the rupturable ring section is formed during the blow moulding. This section can take the form of a neck of reduced wall thickness in the tube and is conveniently at about one third along the length of the tube from the vessel. Other ways of locally weakening the tube can be used to achieve the desired rupturability, and indeed the present containers can be made by other methods which do not involve forming the rupturable ring section during blow moulding.

The containers can be filled with a predetermined volume of liquid, or they can be filled up to a certain level. This second alternative is simpler and cheaper in practice. The tubes are then sealed preferably by heating their ends and passing them through the nip of a pair of rollers. Such a mode of sealing gives a flattened tube portion which may be gripped during the subsequent rupturing of the tube at the rupturable section.

The present invention will now be illustrated by way of example with reference to the accompanying drawings, in which:

Figure 1 is a face view of an unfilled, unsealed container for use in manufacturing a filled drink container embodying the invention;

Figure 2 is a perspective view of a container mount for use with the container of Figure 1 when performing a method embodying the invention;

Figures 3a and *3b* are front and side views respectively of part of the container of Figure 1 after it has been subjected to a sealing operation;

Figure 4 is a vertical section to an enlarged scale of part of the container Figure 1; and

Figure 5 illustrates the opening of a filled drinks container embodying the invention.

Referring to Figure 1, an unfilled, unsealed container 10 of translucent polyethylene comprises a hollow vessel 11 and a tube 12. The hollow vessel 11 is in the idealised form of a figure and the tube 12 extends from the head of the figure. As can also be seen in Figures 3 to 5, especially Figure 4, the tube 12 has a region of local weakness comprising a ring 13 of reduced wall thickness.

A container such as the container 10 is conveniently made by blow moulding with an annular rib of the mould serving to produce the ring 13 of reduced wall thickness. The container 10 has a generally circular base and can be received in a container mount 14 shown in Figure 2. In practice the containers 10 are blow moulded at a high rate and after mounting in mounts 14 are passed to a filling station. At the filling station the tube 12 is used as filling spout and the container is filled with liquid, in this instance around 200ml of a soft drink.

From the filling station the filled but as yet unsealed container is transferred on a conveyor to a sealing station where part of the tube beyond the rupturable ring section is heat-sealed. For this example the part which is heat-sealed is the free end of the tube, and heat sealing is effected by passage of the free end through a heating device and then through the nip of a pair of rollers. After heat sealing

the free end has a flattened appearance and forms a grip portion as shown in Figures 3*a* and 3*b*.

To form an efficient heat seal at high speed, it is necessary to heat the free end of the tube right through so that the inner surface is thoroughly softened. The softened end of the tube is then passed between rollers which press the two sides of the tube together and form a heat seal. The rollers are not heated, and may even be cooled, so that they cool the outer surface of the seal which is thus solidified so as to be firm once the seal leaves the rollers. It may take a little longer for the inside of the seal to solidify.

To open the filled container, the tube may be grasped at the flattened grip portion and twisted to shear the tube at the rupturable section, ring 13. This twisting action is illustrated in Figure 5, and by this means the grip portion can be separated from the rest of the tube. Thereafter, the contents of the vessel can be drunk using the still attached length of tube as a straw. Since the vessel is of polyethylene it readily reduces in volume as the liquid is removed, as a corollary it follows that the container could also be squeezed to aid dispensing of the drink.

From the foregoing it will be seen that the present invention can provide a filled liquid container which has a tear-off or rupturable seal and is economic to manufacture. The tear-off seal is not difficult to use and indeed need present no problems to a child minded to drink the contents of such a drink container. Moreover the container has its own discharge tube which may be used as a straw (where the liquid is a drink) or more generally may be used as a spout to direct the delivery of liquid from the container. Apart from fulfilling such a discharge function, the tube also facilitates filling of the containers prior to the sealing.

CLAIMS

1. A filled liquid container of thermoplastics material which comprises a filled hollow vessel with a tube which extends from the vessel, has a rupturable ring section spaced from the vessel and is sealed so that the seal forms a grip portion, beyond the rupturable ring section, which can be gripped so that a force can be exerted to rupture said section.

2. A container according to Claim 1 which is made of a transparent or translucent thermoplastics material.

3. A container according to Claim 1 or 2 wherein the liquid is a drink.

4. A container according to Claim 3 wherein the vessel is formed as a figure.

5. A container according to any preceding claim wherein the rupturable ring section takes the form of a neck of reduced wall thickness in the tube.

6. A filled liquid container substantially as hereinbefore described with reference to and as illustrated in the accompanying drawings.

7. A method of manufacturing a filled liquid container which comprises blow moulding thermoplastics material to give a hollow vessel with a tube which extends from the vessel and has a rupturable ring section spaced from the vessel, filling the vessel with liquid through the tube, and sealing the tube beyond the rupturable ring section so that the seal forms a grip portion which can be gripped so that a force can be exerted to rupture said section.

8. A method according to Claim 7 wherein the hollow vessel is blow moulded from transparent or translucent thermoplastics material.

9. A method according to Claim 7 or 8 wherein the vessel is blow moulded in the form of a figure.

10. A method according to Claim 7, 8 or 9 wherein the vessel has a bottom which is received in the recess of a container mount for transfer of the unfilled, unsealed container to a filling station and thence to a sealing station.

11. A method according to Claim 10 wherein the container mount is in the shape of an annulus.

12. A method according to any of Claims 7 to 11 wherein the vessel is filled with a drink.

13. A method according to any of Claims 7 to 12 wherein the tube is sealed by heating it and then passing it through the nip of a pair of rollers.

14. A method of manufacturing a filled liquid container, the method being substantially as hereinbefore described with reference to the accompanying drawings.

15. A filled liquid container manufactured by a method according to any of Claims 7 to 14.

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